(IR) to deep ultraviolet UV). Optical switching includes changes in properties such as absorption, reflection, refraction, diffraction, and diffuse scattering of electro-magnetic radiation.

[0031] The term "transparency" is defined within the visible spectrum to mean that optically, light passing through the colorant is not impeded or altered except in the region in which the colorant spectrally absorbs. For example, if the molecular colorant does not absorb in the visible spectrum, then the colorant will appear to have water clear transparency.

[0032] The term "omni-ambient illumination viewability" is defined herein as the viewability under any ambient illumination condition to which the eye is responsive.

Optical Switches

[0033] Optical switches are described in greater detail in co-pending U.S. application Serial No. 09/981146, filed on 10/16/2001 [PD-10005747-1]. A generic example taken from that application is depicted herein in FIG. 1, wherein a display screen 100 is shown that incorporates at least one colorant layer 101. The colorant layer 101 comprises a pixel array using electrical field switchable, reconfigurable, dye or pigment molecules of the present invention, described in greater detail below and generically referred to as a "molecular colorant". Each dye or pigment molecule is field switchable either between an image color (e.g., black) and transparent or between two different colors (e.g., red and green).

[0034] Referring briefly to FIG. 1a, the colorant layer 101 is an addressable pixel array formed of bi-stable molecules arrayed such that a selected set of molecules correlates to one pixel. The colorant layer 101 is a thin layer coated on a background substrate 103 having the display's intended background color (e.g., white). The substrate 103 may comprise, for example, a high dielectric pigment (e.g., titania) in a polymer binder that provides good white color and opacity while also minimizing the voltage drop across the layer. The stratified combination of colorant layer 101 and substrate 103 thus is fully analogous to a layer of ink on paper. In a blank mode, or erased state, each molecule is switched to its transparent orientation; the "layer of ink" is invisible.